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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/406,684	09/27/1999	KAZUHIKO TSUDA	1114-134	1852

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EXAMINER

SCHECHTER, ANDREW M

ART UNIT	PAPER NUMBER
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2871

DATE MAILED: 02/27/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/406,684

Applicant(s)

TSUDA ET AL.

Examiner

Andrew Schechter

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 December 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3 and 8-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,8-14 and 16-21 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 11 December 2001 is: a) ☒ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Drawings

1. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 11 December 2001 have been approved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Response to Arguments

3. Applicant's arguments filed 11 December 2001 have been fully considered but are not fully persuasive.

The applicant argues [p. 9-10] that *Komatsubara* discloses forming the asperities/contact hole not by changing exposure amounts as required by claim 1, but by changing etching conditions, pointing out that their invention is advantageous in that this allows developing to be done in one step after both exposures. The two inventions are clearly different in this regard, but the examiner is concerned that this difference is not clearly reflected in the language of claim 1. Specifically, the type of exposure (UV exposure, wet etch, etc.) is nowhere mentioned, and the language seems to the

examiner to be open to even the possibility that the "various integrals of exposure amounts" and the "an integral of exposure amount different from those of the first region" are different types of exposure. With this in mind, the examiner maintains the previous rejections in view of *Komatsubara*.

The applicant argues that *Chang* is not prior art to the instant application, in view of the priority date of documents 10-273244 and 10-273245. *Chang* is relied upon in the context of teaching a gray-tone photomask. Considering the figures in these priority documents, it does not appear that they support this aspect of the applicant's claimed invention, since gray-tone photomasks are only shown in the figures of the later-dated priority documents. The examiner would therefore be pleased to receive a certified English translation of either or both of these documents showing that they do indeed disclose a gray-tone photomask as implied by the applicants. Until that time, the examiner maintains that *Chang* is prior art to the instant application.

The applicant argues that *Chang* should not be combined with *Komatsubara*, as *Komatsubara* does not use photolithography to form the asperities; this is persuasive to the examiner, but the rejections (claims 4, 5, and 7) over *Komatsubara* in view of *Chang* are moot as these claims have been cancelled.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. Claims 1 is rejected under 35 U.S.C. 102(b) as being anticipated by *Komatsubara et al.*, U.S. Patent No. 4,519,678.

Considering the limitations of claim 1, *Komatsubara* discloses a method of making an LCD apparatus with a pair of substrates and a liquid crystal layer, and reflecting means, comprising [see Fig. 1]: applying a photosensitive resin [col. 3, lines 8-13], forming asperities [lines 17-20], developing the exposed resin [lines 21-24], heat-treating [lines 30-33], and forming a reflecting film [lines 35-44]. The first region is the surface of the resin shown in Fig. 4, having different film thicknesses; the second region is the area of the contact hole, having a resin thickness (zero) smaller than those of the first region through having a different exposure amount. Claim 1 is therefore anticipated by *Komatsubara*.

6. Claims 1, 8, 14, 16, and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by *Ichimura*, U.S. Patent No. 6,181,397.

Ichimura discloses a method of manufacturing an LCD having substrates, liquid crystal, a reflecting film [13a], comprising applying a photosensitive resin [12], forming asperities [12m] which do not extend all the way through, in a first region, and forming a contact hole [30], in a second region, by exposing the first region to various integrals of exposure amounts to get various film thicknesses [see Fig. 4], exposing the second region with an integral of exposure amount different from the first region, developing and heat treating the resin, and forming the reflecting film to contact a TFT through the contact hole [see Example 2]. Claim 1 is therefore anticipated.

The additional limitations of claims 14 and 19 over claim 1 is that first and second photomasks are used, as shown in Fig. 4 [18 and 17]. Claims 14 and 19 are therefore anticipated. Uniform and low-illuminance exposure is done with the first photomask; uniform and higher is done with the second [see Example 2]. Claims 16 and 8 are therefore anticipated.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Komatsubara* as applied to claim 1 above.

The additional limitation of claim 3 is that the second region is formed in a terminal portion in an outside display region. These (necessary and inherent) terminal portions are not shown explicitly by *Komatsubara*. Since they are outside the display region, there is no reason for them to have the asperities of the first region; rather, they need to have the photoresist removed as per the second region in order to make electrical connections to them. Hence, motivated by these reasons among others, it would be obvious to one of ordinary skill in the art to satisfy this limitation. Claim 3 is therefore unpatentable over *Komatsubara*.

9. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Ichimura* as applied to claim 1 above.

The additional limitation of claim 3 is that the second region is formed in a terminal portion in an outside display region. These (necessary and inherent) terminal portions are not shown explicitly by *Ichimura*. Since they are outside the display region, there is no reason for them to have the asperities of the first region; rather, they need to have the photoresist removed as per the second region in order to make electrical connections to them. Hence, motivated by these reasons among others, it would be obvious to one of ordinary skill in the art to satisfy this limitation. Claim 3 is therefore unpatentable over *Ichimura*.

10. Claims 21 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Ichimura* as applied to claims 1 and 14 above.

The additional limitation of claims 17 and 21 is that the resin is a positive photosensitive resin, which is met by *Ichimura*, and that the method further comprises

removing the resin left in the second region after developing. This is not necessarily disclosed by *Ichimura*, but a step of removing resin via dry etching, for instance, is extremely well-known in the art and it would be obvious to one of ordinary skill in the art to do so, motivated among other reasons by the desire to avoid electrical faults occurring due to resin which is left in the second region. Claims 17 and 21 are therefore unpatentable.

11. Claim 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Ichimura* as applied to claim 1 above, and further in view of Japanese Patent Document 09-090426, and *Chang*.

The additional limitation of claim 11 over claim 1 is use of a single photomask having white, gray, and black portions to make the asperities and contact holes. *Ichimura* does not appear to disclose this.

Japanese Patent Document 09-090426 does disclose using a single photomask [see Figs. 7 and 8] to form the asperities and contact holes, and one of ordinary skill in the art would be motivated to do so among other reasons by the teaching of the abstract that as a result, "a contact hole forming stage and a surface roughening stage are made simultaneously executable without using a resist". *Chang* discloses using a gray-tone photomask [see Fig. 17] being used to make an analogous reflector. Use of such gray-tone masks are well-known in the art, and one of ordinary skill would be motivated by use them in this invention, among other reasons, for the reason given by *Chang* [col. 9, lines 30-39] that they are able to manufacture a complex structure with a single exposure. Claim 11 is therefore unpatentable.

Ichimura discloses a positive photosensitive resin, and when incorporating the teachings of '426 and *Chang* the light transmitting portion is over the contact hole, the light blocking and gray portions are over the asperities, so claim 13 is unpatentable.

Use of negative photosensitive resins and positive photosensitive resins are art-recognized equivalents (and obviously require a reassignment of the white, gray, and black portions); it would therefore be obvious to one of ordinary skill in the art to use the method of claim 12, which is therefore unpatentable.

12. Claims 9, 10, 20, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Ichimura* as applied to claims 8 and 14 above, and further in view of *Mitsui et al.*, U.S. Patent No. 5,418,635 and U.S. Patent No. 5,408,345.

Mitsui '635 discloses using the photomask shown in Fig. 4 to shape asperities, rather than the surface provided with minute irregularities [17] of *Ichimura*. This photomask meets the further limitations of claims 9 and 10, and would have been obvious to one of ordinary skill in the art to use it, motivated among other reasons by the teaching of *Mitsui*, '345 that "the bumps are arranged irregularly" [col. 5, line 43] which is "effective...to increase the intensity of light scattering in the direction vertical to the display screen, for the incident light from all angles." [lines 47-50], while the size is motivated by *Mitsui* '635 [col. 6, lines 42-47] among other reasons. Claims 9 and 10 are therefore unpatentable.

When forming the above device of *Ichimura* with the photomask of *Mitsui*, the device of claim 20 will be made (exposing through the photomask produces the flat parts before heat treatment). Claim 20 is therefore unpatentable.

Also when forming the above device of *Ichimura* with the photomask of *Mitsui*, the resin is a positive photosensitive resin. However, positive and negative photosensitive resins are art-recognized equivalents, so it would have been obvious to one of ordinary skill in the art to use a negative resin instead, using inverse masks and switching the high and low illuminances appropriately. Claim 18 is therefore unpatentable.

Allowable Subject Matter

13. Claim 15 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The additional limitation of claim 15 is that the exposure amounts of the first and second photomasks are the same. This does not appear to be disclosed by the prior art of record. When using a single gray-tone mask there is obviously only one exposure amount; however, the examiner is not aware of any motivation for using the same exposure amount when there are two distinct photomasks. This does not appear to be disclosed or fairly suggested by the prior art of record, so it would be allowable if appropriately rewritten.

U.S. Patent No. 5, 408,345 to *Mitsui et al.* and U.S. Patent No. 5,418,635 to *Mitsui et al.* disclose [see Fig. 3] using a photomask to form asperities which do not extend all the way through the resin, but which are formed of two layers of resin. The examiner understands the phrase "the heat-treated photosensitive resin" in each

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independent claim to refer to the "a photosensitive resin" which is applied, exposed, developed, heat-treated, and then has a reflecting film formed on it. The scope of these claims therefore excludes the devices of the type of *Mitsui* where a second resin layer is formed on "the heat-treated photosensitive resin", and an electrode is then formed on that second resin layer. If the applicants have a different understanding of the claim language, they should bring it to the attention of the examiner.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (703) 306-5801. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Sikes can be reached on (703) 308-4842. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 746-4711 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


Andrew Schechter
February 23, 2002

TOANTON
PRIMARY EXAMINER